REMARKS

Claims 1-18 are pending. Claims 7-18 have been withdrawn from consideration as being drawn to nonelected subject matter.

In the outstanding Office Action dated November 26, 2008, the following rejections are pending:

(A) Claims 1-3 have been rejected under 35 U.S.C. 103(a) as being obvious over **Toshiaki et al.** (JP-2002-079600) in view of **Nakahigashi et al.** (US PN. 4,866,746) in further view of **Haaland et al.** (US PN. 5,991,081); and

(B) Claims 4-6 have been rejected under 35 U.S.C. 103(a) as being obvious over **Toshiaki et al.** in view of **Nakahigashi et al., Haaland et al.** as applied to claim 1 above and further in view of **Scholz et al.** (US PN. 5,585,186).

Traverse is made as follows.

A) Arithmetic Mean Surface Roughness (Ra)

Specifically, with respect to claim 1, the Examiner has taken the position that **Toshiaki et al.** teach all of the characteristics (including "(b) the arithmetic mean surface roughness (Ra) of not more than 1.5 nm") except that **Toshiaki et al.** are silent regarding the silicon atomic % within the surface (hereinafter "surface silicon atom content") obtained by x-ray spectroscopy and a reflectance of less than 1 %,

that, however, the surface silicon atom content is obvious from **Nakahigashi et al.**, and that the reflectance is obvious from **Haaland et al.**

Applicants respectfully disagree. As already mentioned in the previous response, in the present invention, the combination of characteristic (b) (arithmetic mean surface roughness (Ra) of not more than 1.5 nm) and characteristic (c) (surface silicon atom content of 10 atom % or more) is essential for the improvement of the **mechanical strength** (such as **surface hardness** and **abrasion resistance**) and **antireflection performance** of the antireflection film **without sacrificing** the color of the antireflection film.

With respect to characteristic (b) recited in claim 1 (i.e., "(b) the arithmetic mean surface roughness (Ra) of not more than 1.5 nm"), the Examiner states as follows.

> "The film is taught to have a silica particle content of 40 to 80 wt% (Par. 0009), and a mathematical average surface roughness of 100 nm (0017). The examiner notes that 100 nm or less overlaps applicants' range of 1.5 nm or less, thus providing a prima facie case of obviousness."

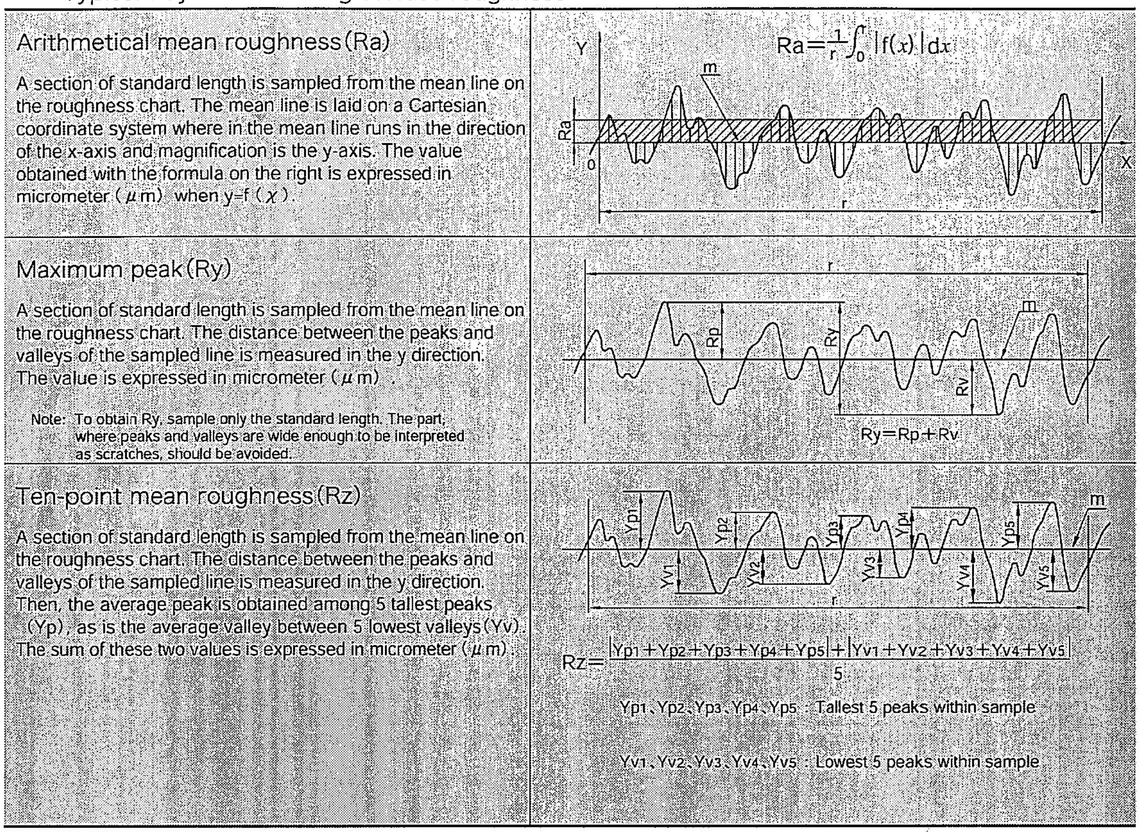
However, the English translation of **Toshiaki et al.** on which the Examiner relies is of such poor quality that the Examiner seems to misunderstand the disclosure of Toshiaki et al. For a correct understanding of the content of **Toshiaki et al.**, the Applicants submit herewith a partial English translation of this reference.

As can be seen from the attached partial English translation, claim 1 of Toshiaki et al. reads as follows:

> "An antireflection laminate comprising a substrate made of glass, a plastic or the like, and having formed on at least one surface thereof a low refractivity composition coating having a nano-porous structure, wherein said low refractivity composition coating has the following characteristics: a haze of 1 % or less, a ten-point mean roughness (Rz) of 100 nm or less, and an arithmetical mean roughness (Ra) of 2 to 10 nm, each of Rz and Ra being as measured with respect to a micro-region having a size of 5 μm × 5 μm." (emphasis added)

As apparent from the above-quoted claim 1 of **Toshiaki et al.,** and as well known in the art, the ten-point means roughness (Rz) is totally different from arithmetical mean roughness (Ra). For reference, the Applicants submit herewith a copy of a material entitled "[Technical data] Surface Roughness Excerpt from JIS B 0601 (1994) and JIS B 0031 (1994)" which is available from www.misumi.co.th/products/technical/mold/pdf/pl1127_1128.pdf., which has the following explanations on Rz and Ra:

Typical ways for obtaining surface roughness



Thus, "arithmetical mean roughness (Ra)" denotes the arithmetical mean value of the absolute values of the profile deviations within the sample area. On the other hand, the "ten-point means roughness (Rz)" is a yardstick for irregularity of the surface roughness, which is measured based on the "5 tallest peaks" and the "5 lowest valleys".

In claim 1 of **Toshiaki et al.**, it is explicitly required that "a ten-point mean roughness (Rz) of 100 nm or less, and an arithmetical mean roughness (Ra) of 2 to 10 nm".

In fact, in all of the Examples of **Toshiaki et al.**, the arithmetical mean roughness (Ra) is more than 2 nm. For easy reference, an English translation Table 1 on page 3 of the attached partial English translation of **Toshiaki et al.** is reproduced below.

		Ex.1	Ex.2	Ex.3	Comp. Ex.1	Comp. Ex.2
Amounts (part by weight)	A	-	30	-	70	-
	B	60	30	-	-	-
	C	-	-	80	-	-
	D	40	40	20	30	40
	E	-	-	-	-	60
Surface roughness Rz (nm)		70	30	50	10	95
Ra (nm)		**7**	**4**	**5**	**1**	12
Reflectance (%)		1.2	1.5	1.5	2.9	1.3
Haze (%)		0.7	0.4	0.5	0.3	4.5
Adhesion		100	100	100	100	90
Pencil Hardness		2H	3H	3H	H	H
Abrasion resistance		Slight scratch	No scratch	No scratch	Large number of scratches	Extremely large number of scratches

Further, it should also be noted that, in Comparative Example 1 of **Toshiaki et al.**, the (Ra) value is 1 nm (i.e., not more than 1.5 nm); however, the antireflection laminate obtained in Comparative Example 1 has poor properties in that the reflectance is as high as 2.9%, the pencil hardness is as low as "H", and the abrasion resistance is poor.

Thus, it is apparent that **Toshiaki et al.** explicitly claim that the (Ra) value needs to be 2 or more and, hence, teach away from the (Ra) value of not more than 1.5 nm. In this connection, reference can be made to Decision by the USPTO Board of Appeals and Interferences (BPAI) in Ex parte Whalen 89 USPQ2d 1078 (July 23, 2008), where the BPAI states as follows:

> "In the same way, when the prior art teaches away from the claimed solution as presented here (EE12, FF20, FF22 and FF24), obviousness cannot be proven merely by showing that a known composition could have been modified by routine experimentation or solely on the expectation of success; it must be shown that those of ordinary skill in the art would have had some apparent reason to modify the known composition in a way that would result in the claimed composition."

The other cited references (i.e., **Nakahigashi et al.**, **Haaland et al.** and **Scholz et al.**) by no means provide any motivation to modify the arithmetical mean roughness (Ra) in **Toshiaki et al.** to "not more than 1.5 nm" in spite of Toshiaki's explicit requirement that Ra value needs to be in the range of "2 to 10 nm".

Further, as already discussed in the previous response, the above-quoted Table 1 of **Toshiaki et al.** shows that the antireflection films according to this reference suffer **trade-off** between the antireflection performance and the mechanical strengths. Specifically, the antireflection films obtained in the Examples 1 to 3 of **Toshiaki et al.** have satisfactory hardness and abrasion resistance; however, the antireflection performance is sacrificed. Especially, in Examples 2 and 3 where the pencil hardness is as high as 3H and the abrasion resistance is also good; however, instead, the reflectance is **unfavorably high** (1.5 %).

On the other hand, in the present invention, both of the **mechanical strength** (such as **surface hardness** and **abrasion resistance**) and the **antireflection performance** ("(d) reflectance of not more than 1 %" recited in claim 1) are **excellent** due to the combination of characteristic (b) (arithmetic mean surface roughness (Ra) of not more than 1.5 nm) and characteristic (c) (surface silicon atom content of 10 atom % or more).

From the above, it is apparent that none of the cited references has any teaching or suggestion about the importance of the combination of characteristic (b) (arithmetic mean surface roughness (Ra) of not more than 1.5 nm) and characteristic (c) (surface silicon atom content of 10 atom % or more), and excellent effects achieved thereby.

Therefore, significant patentable distinctions exist between the present invention and the teachings of **Toshiaki et al.** even in view of **Nakahigashi et al.**, **Haaland et al.** and optionally **Scholz et al.**

B. Reflectance:

Present claim 1 requires "(d) a reflectance of not more than 1 %". With respect to this feature, the Examiner states as follows.

> "one of ordinary skill would find it obvious to minimize the reflectance to desirably zero. They would know that this could be done by adjusting the thickness of the layer due Haaland et al. teaching that reflectance is crucially dependent on coating thickness (Haaland Col. 2, lines 29-37)"

However, it should be noted that the reflectance is greatly influenced by refractive indices of a substrate and a coating formed thereon.

When the refractive index of a film is constant, the reflectance can be controlled by adjusting the thickness of the film as mentioned by the Examiner, but the degree of reflectance adjustable by controlling the thickness is limited due to the refractivity of the film (see, for example, page 2, line 17 to page 4, line 9 of the present specification). That is, after thickness of a film has been adjusted to a critical point, the reflectance can be adjusted only by controlling the refractivity. This is also apparent from the descriptions at col.4, line 25 to col.5, line 14 of **Haaland et al.**

In this connection, it should be noted that, in the Examples of **Toshiaki et al.,** the optical thickness (nd = refractivity (n) × coating thickness (d) (nm)) is optimized (see paragraph [0031] of the attached partial English translation of **Toshiaki et al.**). This means that the reflectance in **Toshiaki et al.** has already been optimized. That is, according to **Toshiaki et al.**, the reflectance is 1.2 % at best as shown in the Examples of this reference, which is outside the range (not more than 1 %) recited in claim 1 of the present application.

As such, contrary to the Examiner's assertion, one of ordinary skill would not adjust the thickness of the layer of **Haaland et al.** to modify the antireflection properties. Therefore, significant patentable distinctions exist between the present invention and the cited references.

C. Improper Combination of References:

With respect to characteristic (c) (surface silicon atom content of 10 atom % or more) recited in claim 1 of the present application, the Examiner states as follows:

> "Although the limitation is not disclosed, this would have been obvious. For example, it is known that the amount of silicon atoms is a result effective variable as it is known that increasing the amount of silicon atoms alters the hardness of a film as illustrated in Nakahigashi et al. (Col. 5, lines 15-35) and it would be recognized by one with ordinary skill in the art that increased hardness would be desirable as this would provide abrasion resistance, etc."

However, **Nakahigashi et al.** belong to a technical field which is too remote from the technical field to which the present invention and **Toshiaki et al.** belong, so that one with ordinary skill in the art would not apply the teaching of **Nakahigashi et al.** to **Toshiaki et al.**

Specifically, the present invention and **Toshiaki et al.** are directed to an antireflection film comprising silica particles. On the other hand, **Nakahigashi et al.** are directed to a coating containing boron (B), nitrogen (N) and one element selected from a group consisting of silicon (Si) and germanium (Ge), which is formed by CVD and used as X-ray exposure mask (see, for example, col. 1, lines 5-10, and col. 2, lines 8-12 of **Nakahigashi et al.**).

In the coating of **Nakahigashi et al.**, the above-mentioned elements are present in the forms of boron nitride (BN) and silicon nitride (SiN_x) (see col. 4, line 17-30 and Fig. 3 of **Nakahigashi et al.**). Thus, at Col. 5, lines 15-35 of **Nakahigashi et al.** (i.e., description pointed out by the Examiner), **Nakahigashi et al.** discuss the relationship between the amount of $\underline{SiN_x}$ in the CVD coating (comprising SiN_x and BN) and the hardness of the CVD coating.

As such, contrary to the Examiner's assertion, it would not be obvious to one skilled in the art that increasing the silicon content in the antireflection films of **Toshiaki et al.** would increase the hardness of the antireflection film based on the teachings of **Nakahigashi et al.** (discussing the amount of SiN_x in a ***CVD coating***) especially when **Toshiaki et al.** teach an antireflection film comprising ***silica (SiO_2) particles***.

Therefore, a *prima facie* case of obviousness cannot be said to exist based on the teachings of **Toshiaki et al.** even in view of **Nakahigashi et al.**, **Haaland et al.** and optionally **Scholz et al.** Reconsideration and withdrawal of the rejections are respectfully requested.

It is believed that the present application is now in condition for allowance.

Conclusion

It is believed that the present application is now in condition for allowance.

Reconsideration and early favorable action are earnestly solicited.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Reg. No. 43,575 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,

By #43,575

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Attached: 1) Partial English translation of **Toshiaki et al.**
2) "[Technical data] Surface Roughness Excerpt from JIS B 0601 (1994) and JIS B 0031 (1994)"